VI.—*Sketch of the Life of the late* Professor Edward Forbes.

By J. H. Balfour, M.D., Professor of Botany, Edinburgh*.

While Europe is mourning over many a gallant officer whose life has been sacrificed for his country on the field of battle, the scientific world has been called upon to deplore the loss of one of its leaders who has fallen in the front ranks. Edward Forbes, Regius Professor of Natural History in Edinburgh, has been cut off in the zenith of his fame, and has left a blank which is not easily supplied. Every department of science acknowledges its obligations to him, and his premature death has inflicted a heavy blow on the progress of Natural History. We have lost an original thinker, a careful observer, a correct reasoner, an able writer, a pleasing and painstaking instructor, and a valued friend. His sun is gone down ere it is yet day, and the extinction of such a luminary has cast a shade over the scientific horizon. Truly God's ways are not as our ways, nor his thoughts as our thoughts. Let us learn the lesson which the solemn event teaches, and so number our days as to apply our hearts to heavenly wisdom.

Edward Forbes (of Scottish extraction) was born in the Isle of Man, on the 12th day of February, 1815. His father was a banker in that island. Even in his early years he had a taste for natural history, and at the age of seven he had collected and arranged a small museum. When not more than twelve years old, Mr. James Wilson informs us, Forbes had imbibed a fondness for geological studies, and had perused such works as Buckland's 'Reliquiæ Diluvianæ,' Parkinson's 'Organic Remains,' and Conybeare's 'Geology of England.' He had also compiled a Manual of British Natural History in all its departments.

He visited London at the age of sixteen, and was engaged there in studying the art of drawing under Sass. His power of delineating with the pencil was called into constant exercise during his after career, and was displayed alike in his published works and in the illustration of his lectures. His early associates remember well the clever and amusing sketches which he made with the pen during moments of leisure.

He came to Edinburgh in 1831, and entered the medical classes, as being the course of study best fitted for initiating him to those departments of science to which he meant to devote himself. His earliest friend in Edinburgh was John Goodsir (now Professor of Anatomy), with whom he lived in the same lodgings for many years. They had congenial tastes, and pro-

* Read before the Botanical Society, Thursday, Dec. 14, 1854.

secuted their studies together with an earnestness and enthusiasm rarely equalled. He attended nearly all the classes required for graduation, but he did not take the degree of M.D. He studied natural history and botany under Jameson and Graham, and became an intimate friend of both, more particularly of the latter, who by his zeal in the prosecution of practical botany inspired his pupils with an enthusiastic love of science.

In 1833, Forbes visited Norway with a fellow-student, and made considerable collections both geological and botanical. Many of the specimens of the plants are now in the Herbarium of the University of Edinburgh. They are by no means well preserved, but they are well selected, more especially as regards their bearing on botanical geography. For at this period of his history Forbes began to look with a comprehensive glance on the flora of Europe, and gave indication of those views of distribution which were afterwards developed fully in the Memoirs of the Geological Survey of Britain. An account of his observations in Norway were published in the Magazine of Natural History. On the 12th of May, 1836, I find a notice by Dr. Graham, in the Proceedings of the Botanical Society, of the flowering of a *Primula*, sent to the Garden by Forbes from Norway. Forbes sent it as a variety of *P. farinosa*, which he called *alpina*, while Graham considered it a variety of *P. Scotica*.

He became a member of the British Association in 1834, and afterwards was one of the most regular attenders of its meetings, contributing on all occasions valuable papers and reports. He it was who called the attention of the Association to the subject of dredging, and secured their cooperation and aid in this most important matter.

He appears to have visited the Alps in 1835; and in the Magazine of Zoology and Botany for 1837, he contributed a communication on the Comparative Elevation of the Testacea in the Alps.

His zeal for botany was at this time very great, and he saw the importance of not confining his attention to the flora of Britain. He therefore determined, along with his fellow-students in Edinburgh, to commence the formation of a public herbarium, by means of contributions and exchanges. This led to the establishment of the Botanical Society, an event which took place on Tuesday, the 9th of February, 1836. Well do I recollect the evening when he and I, with eight others, viz. W. H. Campbell, now LL.D. and attorney in Georgetown, Demerara; Dr. Parnell, afterwards author of the work on British Grasses, &c.; Dr. R. C. Alexander, who subsequently published accounts of botanical tours in many parts of Europe and America; William Brand, now Secretary of the Union Bank; Dr. Gilbert McNab, now practising in Jamaica;

James McNab, now Curator of the Botanic Garden; Nicholas Tyacke, now physician in Chichester; Edward Charlton, now M.D. and Lecturer in the Medical School of Newcastle; George C. Wallich, now in India; and Giles Munby, who wrote the 'Flora of Algiers,' met to lay the foundation of our Society. We received most important directions and aid from Forbes; and when, after launching the vessel, we supped together, his social and convivial powers were called forth in their fullest energy. His death constitutes the first blank in the little band. The first public meeting of the Society took place on the 17th of March, 1836, when the following office-bearers were appointed:—Prof. Graham, *President*; Dr. Greville and Dr. Balfour, *Vice-Presidents*; Dr. Neill, Mr. Falconar, Dr. Barry, Mr. Munby and Mr. Tyacke, *Councillors*: W. H. Campbell, *Secretary*; Edward Forbes, *Foreign Secretary*; William Brand, *Treasurer*; and James McNab, *Curator of the Herbarium*. Forbes contributed many valuable communications and papers to the Society between the years 1836 and 1841.

On the 9th of June, 1836, Forbes gave a description of a species of *Viola*, found by him in the Isle of Man. He considered it the *V. ericetorum* of Schrader, *V. canina* of Reichenbach. On the 8th of December, 1836, a communication was transmitted by him, as to a supposed new British *Polygala*, found in the Isle of Man and on Dalmahoy Hill. He also brought under notice the various British forms of *Euphrasia*, some of which he was disposed to consider as distinct species. This view he continued to entertain; and when visiting the hills at the head of Loch Lomond in July 1854, he pointed out three of these forms to his pupils and mine.

On April 12, 1838, he read a paper to the Botanical Society, on the specific claims of *Primula acaulis, veris*, and *elatior*.

He continued during life to take a warm interest in the Botanical Society; and he resumed his place among us last summer, with no small feelings of satisfaction—with pleasant reminiscences of the past and brightest hopes of the future. He has sent contributions to the Herbarium of the Society from various parts of the world, and these are now incorporated with the University Herbarium.

He continued to prosecute his studies more or less continuously in Edinburgh till 1839. During that period he made himself beloved by all who came into contact with him. He inspired almost all his companions with zeal in science, and became as it were a centre whence emanated numerous active and enterprising naturalists.

In 1837, he prosecuted his studies in Paris under Prévost, Beudant, Geoffroy St. Hilaire, and De Blainville. In May of

that year he went to Algiers; and in the Annals of Natural History for May 1839, he writes on the Land and Freshwater Mollusca of Algiers and Bougia. In 1838 appeared his '*Malacologia Monensis*, or Catalogue of the Mollusca of the Isle of Man and of the Irish Sea.' At this time also he wrote many papers on zoology and geology.

In the winter of that year his literary, artistic, and humorous powers were called into play in a publication named 'The Maga,' which became for a time a most popular work with students, more especially at the period subsequent to the snowball riots of the 11th and 12th of January of that year. He was one of those who took up the defence of the students on that occasion, acting as chairman of their committee; and he succeeded, with the aid of Patrick Roberton, now Lord Roberton (who is figured as their glorious defender), in carrying them through the trial in a most triumphant manner. This publication, with the poems which came from his pen at that time, as well as his sketches of men and manners, have left an indelible impression on all of us.

While all this was going on, he continued sedulously to pursue his natural-history studies. His usual working hours were from breakfast-time till 2 or 3 in the afternoon, after which he considered that he was entitled to a certain amount of relaxation from severer study. The same plan has been adopted by him ever since, when practicable: and one reason among others for his objecting to take an early hour for lectures was the encroachment which would thus have been made on the hours devoted to original observations.

In 1838 he visited Styria and Carniola, with the view of examining their natural history. His observations were recorded in the Proceedings of the Botanical Society. Thus on the 13th of November 1838 he read a paper on the *Primula elatior* of Jacquin, gathered by him during the summer of 1838 on the mountains of Styria; on the 13th of December 1838 he gave an account of three days' excursion to the mountains of Ternova in Carniola, made in company with Signor Tommasini of Trieste. On the 10th of January and 11th of April 1839 he read communications on certain continental plants allied to British species, the plants having been chiefly collected in Carniola and in the neighbourhood of Trieste.

In the summers of 1839–40 he delivered a scientific course of lectures on zoology, as well as one of a more popular nature, in which he pointed out the bearings of zoology on geology, a subject of which he was afterwards the most able expounder in Britain.

In 1839, at the Birmingham Meeting of the British Association, he and other naturalists finding that they had not their

proper place at the convivial meetings, instituted a separate ordinary. The first Natural History Section dinner happened to take place in an inn of that town having the sign of the Red Lion; and ever afterwards the Natural History Club thus commenced was designated the Red Lion Club. The Red Lions have had their annual social reunions at every meeting of the Association since that time; and on these festive occasions, Forbes, who was perpetual president, had always a scientific song of a playful and humorous nature. Many of these songs were printed in the 'Literary Gazette.' It is interesting to notice, that among his papers was found an unfinished song, which he meant to have given at the Liverpool Meeting, and which contains a clever view of the geological dispute between Murchison and Sedgwick.

During this year he seems to have taken up in an especial manner the subject of fossil botany; and we find, on the 10th of May, that he proposed that the Botanical Society should print a Catalogue of the Fossil Plants of Britain. The Society entertained his proposal, and appointed him, along with his friends Torrie and Cunningham, to prepare the list.

He published this year 'Zoological Researches in Orkney and Shetland,' and zoological papers in connexion with Goodsir. In the 'Report of the Botanical Society's Proceedings' of the 12th of December 1839, and also on the 10th of December 1840, he is entered still as Foreign Secretary, as Member of the Wernerian Society, and as Lecturer on Natural History.

In 1840 he published in the 'Edinburgh Student's Annual,' a paper on the Distribution of the Mollusca of Britain, more especially with reference to the Pleistocene Geology.

In 1841 he published his beautiful Monograph on the British Star-Fishes, and other Echinoderms. The accurate drawings of the animals, and the exquisite tail-pieces and vignettes, were drawn by himself on wood, so as to be ready for the woodcutter. During my morning visits to him at this time, I found him always busy with his pencil.

On the 11th of March of this year he read to the Botanical Society a paper on the Specific Value of the Antherine Appendages of the genus *Viola*, in which he developed philosophical views in regard to what he calls the law of *undulation* of character in plants and animals. This law, he says, "has not been properly studied by naturalists, nor its value rightly appreciated; otherwise we should not have that common scientific phenomenon of imperfect descriptions presented as specific characters." The paper embraced not merely a description of the characters of the genus *Viola*, but an illustration of this law in the arrangement of the species, and their geographical distribution. It contains the germ of those views which he afterwards so fully enunciated, relative to types and representations.

In the spring of 1841 he accepted an invitation from Captain Graves, of the Beacon, to join the surveying party in the Mediterranean, in the capacity of naturalist. He and I met in London in April, along with Vogel, McWilliams, and Stanger, who were about to join the expedition to the Niger.

He was occupied until 1842 in examining the Ægean and the coasts of Asia Minor. During part of the time he visited Lycia and assisted Sir Charles Fellowes, along with Mr. Hoskyn, Mr. Daniell and Lieut. Spratt, in the exploration of some of the lost cities. His researches in the Ægean, in regard to marine life at different depths, led to those speculations which he afterwards promulgated relative to submarine life in connexion with geological changes. During this expedition his friend the Rev. E. T. Daniell died of fever brought on by malaria, and Forbes's life was also placed in imminent danger by a similar attack. He struggled through the fever, after lying for nearly a fortnight in a helpless state, without tasting food or receiving any medical advice. This Ægean fever materially affected his constitution, and he had frequent aguish attacks afterwards, which he looked upon as referable to that illness.

During his researches at this time he looked with a naturalist's eye at everything, as is well shown in his 'Travels in Lycia,' which he afterwards (in 1846) published, in conjunction with Lieut. Spratt. Botany, zoology, geology, geography and antiquities were alike subjects of study and observation.

In July 1821 he wrote thus from Paros :—

"Paros, 24 July, 1841.

"Dear Balfour,

* * * * * * * * * *

Here I am out of the world, working away like *bricks* (so to speak) in the midst of ruins. Hitherto my working has been almost entirely mineralogical and zoological, owing to delays on the part of the Oriental Steam Packet Company. Only three days ago did any of my parcels reach me, but they are now all here,—the box from the Botanical Society, a parcel of paper in oil-cloth from Dr. Graham, and a box from Sir William Jardine. I have dried a lot of plants in the paper which I got at Malta, but have hitherto regarded rather the collection of specimens to illustrate the flora of the Isles, than of duplicates, not having materials for the latter. Unfortunately the lateness of arrival of the box will prevent much being done in that way *here* this year, as the flora is almost gone, burnt up already, and there are no mountains sufficiently high for subalpine plants. Those of Naxos which I have ascended are 3500 feet high, but the vegetation of their summits is the same as that of their bases.

"I have just returned from a cruise among the islands, and I have been five weeks away in a little cutter with every convenience. The botanical result is, that the vegetation of all the islands I have seen is *exactly* similar.

"I set off next week in another of our tenders on a six weeks' cruise, to visit the Volcanic isles and the south end of the Morea,—I hope with better botanical results. But as I said before, for botany one should be at work here in April. Next year I shall be better prepared for it. If one of the Commander's schemes, however, is put into execution, I expect yet to reap a rich harvest of plants this autumn. He proposes to send the 'Isabella,' one of our tenders, to the Gulf of Macri in Asia Minor to complete a survey. He will remain there six weeks, and I propose to go with him and ascend the snowy ridges of Taurus, which are within a few miles of Macri. As these mountains are from 5000 to 10,000 feet high, I may yet get a rich store of valuable plants from a country almost, if not wholly unexplored.

"I hope yet we shall go to Candia in spring, which will be a great point for the botany. The zoological results, so far chiefly marine, have fully satisfied me, and I expect will prove most valuable. I am at work every day, and although I have a glorious set of companions, work very hard. I wish there was some one with me to do the dredging and preserving, as it takes up much time. As yet I have left birds alone. I expected Thompson to have done them, but he is off home again, as I suppose you know already. Fishes, I let none of them escape me."

Another letter is dated—

"H.M.S. Beacon, Macri, Asia Minor,
February 28, 1842.

"In my last letter I mentioned my intention of proceeding to Asia Minor in one of the Beacon's tenders in autumn. Having done so in the early part of last October, it has been out of my power to write to you or any of my friends, as there is no communication between these shores and Europe. Still I expected to have written to the British dominions letters in abundance before the new year began; but circumstances most unexpected have sent the Beacon down here to join us, and prevented our joining it at Athens, as was intended.

"To give my itinerary in due order, my proceedings have been as follows:—Returning in October from a round of the islands of the Archipelago,—a cruise which was exceedingly fruitful in results as regarded marine zoology and tertiary geology, but in consequence of the season almost fruitless in botany,—I found the Beacon at Paros with half her crew laid up by the terrible fever which kills so many people here in summer, one of her best officers dead, and all in low spirits. The people under my charge,—for (you will laugh, I doubt not when I say so,) I have not only acted out here as naturalist, but when accompanying the tenders, as surgeon,—escaped altogether. In several cases here I really find my medical knowledge, small though it may be, of the greatest service. Indeed, at the present moment I am acting as physician in ordinary to the greatest personage in the country near us, namely, the Mohussil or Governor of Severo, 'a very great Turk with a very long name,' as the song goes.

"From Paros I set sail in our little schooner the *Isabella* to the

shores of Asia Minor, and remained in her from October to the end of the year. I was thus able to make my promised excursion to the Taurus, ascending the mountains to the height of 9000 feet, and journeying among them for fourteen days. But though I loaded a mule with boards and paper, I grieve to say I could not fill it. Everything seemed to have gone out of flower to spite me, and what remained were odds and ends of plants past flowering.

"As this country, especially the alpine part (I speak of Lycia), has been visited by no botanist, I gathered every fragment most religiously, with a view to depositing the reliques (such as they are) in the Botanical Society; and they are now packed up and boxed in the charge of the captain of an English vessel which has unexpectedly come in here, and will be carried by him free of charge to some English port. I have directed them to Pamplin. Open and examine them when they come. Bad as they are, they have a geographical importance, and I do not take blame to myself for their badness.

"Next week the Beacon goes to Malta; if she had only stayed a month longer, I should have had lots of plants, now only beginning to flower. I remain behind with a view of rejoining her in Candia in May. I go up the country, but as it will be impossible during that journey to collect many specimens of everything, I shall confine myself to making a pretty perfect set of Lycian plants for the herbarium of the Botanical Society, Ward, Graham and yourself, which on consideration I think will be the best way of benefiting science in a country as yet unexplored, and better than laying by dubious stores. I enclose a table of the winter vegetation here to give you an idea of it. Lay it on the table at some meeting of the Society. I have not been fortunate hitherto in seeking after materia medica information, but hope to be so."

After having carried on his researches in the Ægean Sea, he had determined to proceed to Egypt and the Red Sea on a dredging excursion, when intelligence reached him that he had been chosen Professor of Botany in King's College, London, as successor to the late Professor Don. Application for this had been made by Goodsir and some other friends in his behalf, and his claims were at once recognized by the electors.

In 1842 he came to Britain with collections and drawings of scenery, of antiquities, of plants, of animals, and of men and manners, which in extent, variety, scientific value and artistic skill have never been equalled. A sum was voted by the Treasury for the publication of these, which Forbes intended to append to a treatise on the Natural History of Aristotle, a work for which he had collected ample materials. He commenced the preparation of 'Rambles of a Naturalist,' and in 1843 he writes, "my leisure now I give to my long advertised 'Rambles.' The cuts are done, but the middle of the book is yet unwritten."

His introductory lecture on botany was delivered in King's

College on May 8, 1843, and is a valuable one, full of original views and of potent arguments in favour of the educational value of Natural History. He now rose rapidly in favour. In 1843 he was appointed Curator and Assistant Secretary of the Geological Society of London, and became a Fellow of the Linnæan Society. At the meeting of the British Association at Cork this year he read a Report on the Mollusca and Radiata of the Ægean Sea; and as connected with his Ægean 'Travels,' he subsequently published remarks on the light thrown on geology by submarine researches. In October 1843 he writes thus:—

"Geological Museum, Somerset House.

"Dear Balfour,

"I have intended to write to you for a very long time, but intentions are not always deeds with me, in consequence of having a mass of work in hand,—mostly not my own,—which must be done, and which absorbs all my time. The fact is I have too much to do,—this geological post being a desperately fatiguing one, and leaving but little time for my more legitimate occupation at King's College. My class last summer went off very well. I had a most excellent set of men, who behaved admirably and never flagged in attendance. I had three or four excursions of much interest, managed in our old fashion, alarming the neighbouring villages by an invasion of twenty or so *vasculiferi*. Shaw acted as my esquire and jester on all these occasions, and Lankester, with some other amateurs, also occasionally joined my ranks. My pupils were 48 in number, next to Lindley's, the best botanical class in London. If the 48 all paid the fees into my pocket 'more Scotico,' it would be very satisfactory, but the College absorbs more than a fourth of it, so that my receipts were much under the hundred, and as in one's first course there are many expenses, I get but little out of the total. As the College has a diagram painter, there was a saving on that score; for being obliged to be at the Geological all day long, I have no time to paint diagrams. The most provoking want is having no botanic garden, and I have no spare days to run after and make friends with gardeners, so that I have great difficulty in procuring fresh illustrations. Hooker offered me them from Kew, but on condition that I should go and select for myself personally, which is impossible as I am situated. We have a capital herbarium at the College, but when it is to be put into the state it should be I really cannot tell. It vexes me much thus to find myself unable to give sufficient time to any one thing.

"The Medical Professors at King's are a capital set of men, enthusiastic and talented. I have a fine room for a Museum, and should desire nothing better than time and fortune to do as I like there. I am now only beginning to touch my Eastern plants. When they are sorted they shall be distributed, but I cannot promise as to the time. My pupils in the Beacon are collecting with great success, and sent me a few days ago a beautiful little parcel from Mount Ida in Crete, including some things which may be new.

"I commend your intention of writing a text-book. What we want is a clear statement of the present state of vegetable physiology and anatomy, and a concise and *contrasting* view of the orders in a portable class volume. I speak now from having felt the want of such."

In the position of Geological Curator, "his extensive knowledge of recent vegetable and animal species, and his remarkable acquaintance with the laws of their distribution (particularly as regards invertebrate animals), became available for general palæontological research. Here, too, he was enabled to apply to geological research that peculiar knowledge of the conditions of existence of species, which his continual operations with the dredge had led him to. We owe to him the methodical use of the dredge as an instrument of research in natural history; to use his own words, 'the dredge is an instrument as valuable to a naturalist as a thermometer to a natural philosopher.' At his instance, the British Association has appointed for many years a dredging committee, charged with the duty of completing our knowledge of marine animals, with a view to geological inquiry."

In 1845 he became a Fellow of the Royal Society, and was afterwards a Member of Council. He was appointed Palæontologist to the Geological Survey of Great Britain, under Sir Henry De la Beche, and subsequently became Professor of Zoology and Palæontology in the Government School of Mines. He gave lectures in King's College, in the Royal Institution, in the School of Mines, and at Marlborough House; and he arranged the fossils of the splendid Geological Museum in Jermyn Street. He continued to prosecute his practical geological work in various parts of the kingdom, and published from time to time the results of his researches.

About the year 1846, he was attacked with a severe illness of a nephritic nature, during which his life appeared to be in great jeopardy. Although he recovered from the attack, yet the effects of it were frequently felt by him afterwards; and it seems to have laid the foundation of his fatal illness. He often remarked, that he appeared to possess great vitality, from having struggled through two such serious attacks; and, in his last illness, his hopes were for a time kept up by the idea he entertained of his vital powers.

Towards the end of the year 1846, he published, with Lieut. Spratt, his 'Travels in Lycia,' a classical work, containing interesting episodes in natural history, with a 'Sketch of the Botany of Asia Minor and the Ægean.' About the same time appeared his Monograph of the Southern Indian Fossils, in the

Geological Transactions, illustrated by the best plates of fossil Invertebrata ever done in England.

About this time he wrote on the connexion between the distribution of the existing Fauna and Flora of the British Isles, and the geological changes which have affected their area.

In 1848 his admirable Monograph on the British Naked-eye Medusæ was published by the Ray Society.

Subsequently appeared his Palæontological and Geological Map, contributed to Johnston's Physical Atlas; and in 1850 he completed, with Mr. Hanley, the splendid work on the 'Natural History of the British Mollusca and their Shells.'

His wonderful facility in all departments of science was due, Hooker says, to the early age at which he acquired its rudiments, and to the efficient practical training in systematic botany and collecting which he received in Edinburgh; to his quick perception of affinities; to his philosophical views of morphology, distribution, structure, functions, and the mutual relations of all these; to his mind being richly stored with the literature of the sciences; to the wide experience obtained during his travels; and, finally, to that heaven-given power of generalization and abstraction which he so eminently possessed.

In 1848 he married a daughter of the late General Sir C. Ashworth. It is curious to notice, that during that year four were married out of the ten who met to institute the Botanical Society.

In 1852 he published some valuable observations in regard to genera and species, in reference to which I received the following letter:—

"Jermyn Street, 19th June, 1852.

"My dear Balfour,

"The paper I sent you is a brief abstract of a long lecture*. It contains, in fact, only the table of contents, without the illustrations and comments: hence its obscurity.

"My notions about *genus* are these:—

"What we call class, order, family, genus, are all only so many names for *genera*, of various degrees of extent. It is in this sense I use the word *genus* in my lectures. Technically, a *genus* is a group to which a *name* (as *Ribes*) is applied; but *essentially*, *Exogens*, *Ranunculaceæ*, *Ranunculus*, are genera of different degrees.

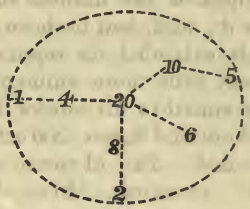
"Now, one of the chief arguments in favour of the *naturalness* of genera (or *groups*, if you like), is that derived from the fact that many genera can be shown to be *centralized* in definite geographical areas (*Erica*, for example); *i. e.* we find the species gathered all, or mostly, within an area, which has some one point where the *maximum* number of species is developed.

"But, in *geographical space*, we not unfrequently find that the same genus may have two or more areas, within each of which this

* [Inserted in the 'Annals' for July, 1852.]

phænomenon of a point of *maximum* number of species is seen, with fewer and fewer species radiating, as it were, from it. [This is what I speak of under C, as *more centres than one in geographical* space.]

Area of a genus.

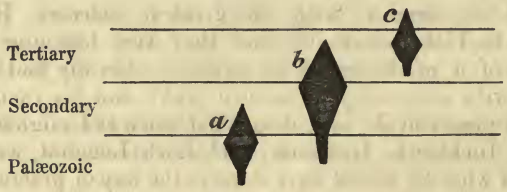


The numbers refer to species.

[This diagram is imaginary.]

Thus, *Viola* has an American as well as an Old World point of maximum of development, around which you may group the species, gradually diminishing in number.

"In *time*, however (or, in other words, in *geological distribution*), so far as we know, each generic type has had, so to speak, an unique and continuous range :—



Thus we find that all the species of genus *a* are grouped together within a succession of formations which commence at a certain point, and cease at another; so with *b*, so with *c*; but when once a *generic type* (as *Trilobites*) has ceased, it never reappears. Therefore I speak of a genus having an *unique centre* in time.

"Under *italic c* I say, that a genus is an abstraction, a divine idea. I think the very fact of the centralization of groups, of allied species, *i. e.* of genera, in space and time, is sufficient proof of this. Doubtless we make many so-called genera that are artificial; but a true genus is natural; and, as such, is not dependent on man's will.

"I dare say that I have only added obscurity to obscurity by this explanation; but, with diagrams, and time for talk, I think I could make the matter quite clear.

"Yours very sincerely,

"Edward Forbes."

He was elected in 1853 to the Presidentship of the Geological Society; and delivered, on leaving that office, an admirable

address on the state of geology, which has been recently published.

In May 1854, on the demise of Prof. Jameson, he was called to the Chair of Natural History in this University. This had long been, to him, an object of his highest ambition. No one was so well qualified for it; and, had he been spared, he would undoubtedly have greatly extended its reputation, and would have made our university still more eminent as a school of science. Often had he stated in his letters, that he looked on Edinburgh as a place where the finest Natural History School in Europe could be formed. The Museum would, under his auspices, have mightily increased. Even during the short period he was with us, boxes of specimens were coming in from all quarters. He had resolved to dedicate himself to the work of arrangement; and his services in connexion with the New Museum of Economic Geology were looked forward to as of immense importance. The opening of the Museum to the public, and to all students of natural history, was an object he had in view; and he had already shown his liberal spirit by opening it to the pupils of natural history under Dr. Fleming at the New College.

He lectured last summer with the greatest success. His class amounted to 150, and all felt that they were listening to the prelections of a master-mind in science. Already had he inspired many with something of his own zeal; and his excursions to various places in the neighbourhood, such as Craigleith, Arthur's Seat, Inchkeith, Inchcolm, and Loch Lomond, were but foretastes of what he would have done in the way of practical geology. He had laid large and comprehensive plans, both as regards zoology and geology, and had commenced in earnest museum work.

Those who had the privilege of being with him in the class-room and in the field during his short career in Edinburgh as a Professor, saw something of his merits as an expounder of nature in a comprehensive way. He took an enlarged grasp of science in all its departments, and in all countries; his prelections were of a nature never yet equalled in Britain. With all his knowledge, he combined an affability, a modesty, a kindness, and patient perseverance which endeared him to every one. No student of nature was beneath his notice; no fact recorded by a pupil, however humble, was passed with neglect. He was ready at all times to be questioned, and was prompt to point out any spark of merit in others. He had no jealousy, and never indulged in attacks on others. He gave full credit to all, and was more ready to see the bright than the dark spots in the character. Even to those who had criticised him severely,

he bore no ill will, and he certainly did not return railing for railing. He had a truly generous spirit, and was totally devoid of narrow bigotry. He was desirous of promoting science, independent of all selfish views. He loved it for its own sake. He had a noble temper, unaffected by good or ill fortune, and he was universally and deservedly beloved.

After his summer lectures he was busily engaged arranging matters in London. He made excursions in different directions, and his last dredging was carried on with myself, Dr. MacDonald, and Prof. Wyville Thomson, at North Berwick, in September last, previous to the meeting of the British Association. He attended that meeting in Liverpool, and occupied the chair in the Geological section. He made communications both to the Zoological and Geological sections. Few will forget the brilliant eulogium passed upon him by Prof. Sedgwick, at the conclusion of the business of Section C.

After the Association Meeting he spent some time in Dumfriesshire, and was there exposed, during an excursion, to wet, which was followed by shivering and febrile symptoms. These were supposed by him to indicate a return of his Ægean fever. When he came to Edinburgh he was by no means well, but much was attributed by him to being overworked. In spite of this he continued to labour, visited Mr. Murray of Monckland, for the purpose of observing geological phenomena, and vigorously set about preparation for his winter work, as well as for the 'Edinburgh New Philosophical Journal' (previously Jameson's), of which he and Dr. T. Anderson were now the editors. He also revised his elaborate Paper on the 'Geological and Palæontological Map of Britain' for the new edition of Johnston's 'Physical Atlas.'

One of his latest productions was the article 'Siluria' in the last Quarterly Review, which concludes with this passage, so characteristic of his peace-making spirit:—

"Men whose work, both of head and hand, is done mainly under the broad sky, and along the craggy sides of mountains, heedless of weather and toil, are not likely to use mincing forms of speech or mollify their sentiments when engaged in discussions, though all the time mildness and mercy are at the foundation of their thoughts. Better and truer men, whether in field or council, there are not living than the two famous geologists, the nature of whose differences we have endeavoured to expound. They have worked long and well in co-operation, heart and hand united; and though the fortune of scientific war has led in the end to the crossing of their pens, the names of Sedgwick and Murchison will go down to posterity, side by side, and bracketed together in the glorious list of benefactors of mankind through the advancement of science."

He commenced his lectures on 1st November, 1854, and gave an introductory address, which has been found among his manuscripts, and will appear as a posthumous work in the January number of the Edinburgh New Philosophical Journal. He lectured for five or six days, and entered seventy-one pupils in his class roll. During all this time he complained more or less of febrile symptoms. These at last increased so much that he consulted Dr. Bennett, who at once ordered him to give up lecturing. This he did on Thursday the 9th of November, in the hope of being able to resume work on the Monday following.

On Saturday the 11th, I received a note from him, in which he enters fully into the reasons for not altering the hour of his lecture, as had been proposed by some of his colleagues. He very truly says, "For my own part I hold that to change any hour of lecture after the arrangements of the session are completed and advertised, is both deleterious and unbusinesslike * * *. The first consideration should be academical convenience; the next, the propriety, if there are to be changes, of announcing them a full session beforehand; the last, private convenience." He concludes by saying, "I was too ill to venture to the Botanical Society on Thursday."

During his illness he was very anxious about the Journal, and on Monday the 13th he wrote a note to me, in which he says, "I am completely shattered for the moment, and don't know how to get on with the Journal, being so ill. Could you look in upon me and advise? I am still in my bed." This is probably the last note he wrote.

I visited him on Tuesday, and found that he had been suffering great pain, and although the violent symptoms were relaxed, he was unable to converse with me. On Wednesday the 15th he was rather easier and was able to give me directions about the papers for the Journal; spoke with great anxiety about his pupils and his class, and gave a message to several of them.

From that time the disease increased, and the symptoms became of a very alarming nature. He was attended assiduously by his old friend Goodsir, along with Dr. Christison and Dr. Bennett; but all medical skill was unavailing. On the evening of Friday he gave his last directions, leaving his specimens to the College Museum, at Edinburgh, and his papers to Robert Godwin Austen, Esq. He continued to sink, and died at $5\frac{1}{4}$ P.M. on Saturday 18th November, being sensible to the last.

In announcing this sad event at the Council Board, the Lord Provost said it was his melancholy duty to notice the removal from amongst them by death of Professor Edward Forbes, one of the most distinguished ornaments of their University. Professor Forbes was appointed to the Chair of Natural

History so recently as May last, and the appointment, made by the Crown at the unanimous suggestion of the Council, was hailed by them and by the whole scientific world as an acquisition to the University, and as one which would in all likelihood tend to increase its celebrity in that department to which he had directed his attention. He had given a course of lectures during the summer, and had entered upon his winter course, when a disease of some standing suddenly removed him from among them. He (the Lord Provost) knew that the Council would deeply mourn the loss which they had thus sustained. Professor Forbes had been cut off at the very commencement of what they had fondly hoped would be a career of increased usefulness in a position which it had been one of the dearest objects of his heart to attain. He (the Lord Provost) had to propose that the Council should express their deep sympathy with his bereaved widow and family at the loss which they in common with the community had sustained, and that, as a mark of respect to his memory, they should offer to attend his remains to the tomb.

The body was interred in the Dean Cemetery on Thursday 23rd November, near the burying-place of Professor Wilson, and the funeral was attended by his colleagues, the Lord Provost, magistrates, council, a large concourse of students, and nearly all the followers of science in Edinburgh.

Only a few days before his death he had been elected by the Royal Scottish Academy to fill the honorary office of Professor of Ancient History, in room of the late Professor Wilson.

Immediately after the funeral, a meeting was held at Dr. Bennett's house, which was attended by many of Forbes's friends in London, Edinburgh and the provinces, at which it was resolved to have a marble bust of him executed by Steel, to be placed in the College Museum. It was also proposed that a duplicate might be placed in the Jermyn Street Museum. Mr. Goodsir had taken a cast after death, which supplies important materials for the bust. It is expected that the model will be ready for the London Exhibition in May 1855, and the busts by January 1856. It is announced that his pupils in King's College, London, have met for the purpose of procuring a similar memorial of their late Professor.

At the request of several of his friends, Dr. George Wilson, one of his early companions, has kindly consented to draw up a memoir of him, and is now collecting materials for that purpose. It is hoped that all who can supply information in regard to the career of our late departed friend, will communicate as soon as possible with Dr. George Wilson at Surgeons' Hall. The memoir will probably appear as a separate volume.

I cannot more appropriately conclude this sketch of my de-

parted companion, friend and colleague, than by quoting the statements made regarding him by four men of eminence, viz.—an anatomist, a botanist, a geologist, and a zoologist, who well knew his merits. Goodsir says, "Professor Edward Forbes was pre-eminently a naturalist. His attention had never been exclusively directed to any one of the Natural Sciences. He was equally a botanist, a zoologist and a geologist, from first to last. With a remarkable eye and tact for the discrimination of species and the allocation of natural groups, he combined the utmost delicacy in the perception of organic and cosmical relations. He possessed that rare quality, so remarkable in the great masters of Natural History, Linnæus and Cuvier, the power of availing himself of the labours of his brethren—not, as is too often the case, by appropriating their acquisitions, but by associating them voluntarily in the common labour. Entirely destitute of jealousy in scientific matters, he rather erred in overrating than in underrating the services of his friends. He was consequently as much beloved and confided in by his seniors in science as by the youngest naturalists of his acquaintance.

"Possessed of such comprehensive intellectual sympathies, Professor Edward Forbes has always been considered by his friends in Edinburgh and other places as the co-ordinating spirit of his circle; and his return as Professor of Natural History was considered by all who knew him as a guarantee of the steady progress of his favourite science in the metropolis of Scotland. But, alas! by a dispensation of Providence, wise, doubtless, though inscrutable and painful to us, he has been cut off. Nevertheless, it may be, that short comparatively though his career has been, he has already, in his writings and in his influences on his friends and pupils, left behind him such germs of thought as shall hereafter develope themselves in the advancing science of the period, and so secure for our departed friend that full measure of scientific results which he ever longed after, not out of vain glory, for no man could be more free from such a feeling, but for the good of mankind and the glory of God."

Dr. Joseph D. Hooker writes:—"Endowed with real genius, possessing many and highly cultivated talents, no less conspicuous as an original thinker than as a hard and conscientious worker, accomplished in literature and art, equally graceful and ready with pencil or pen, in the lecture-room as in the closet, and with far rarer qualities than all these—the purest and most disinterested love of science, and the most generous appreciation of the labours of others—it is no wonder that he was beloved and admired beyond any natural historian of his day."

Hugh Miller, in the conclusion of his late admirable address on the fossiliferous deposits of Scotland, when resigning the chair

of the Royal Physical Society, remarks: "I trusted to have had the honour of resigning the chair to a gentleman (Prof. E. Forbes) who, fifteen years ago, was one of the most active and zealous members of the Royal Physical Society; and who had, since that time, achieved for himself in natural science in general, and in geology in especial, a reputation co-extensive with the civilized world. But, alas! Death reigns. This distinguished man, in the full blow of his fame, and in the mature prime of vigorous manhood, has passed suddenly away; and wherever in either hemisphere physical science is cultivated, or the by-past history of our globe excites its legitimate interest, his early death will be felt and deplored as a heavy loss. The spoiler has broken abruptly off many a train of ingenious thought, cut short many a course of sedulous inquiry, arrested, just ere its formation, many a profound induction, and scattered hoards of unrecorded knowledge, the adequate re-gathering of which many years to come may fail to witness. But our idle regrets can neither restore the dead nor benefit the living. Let us rather manifest our regard for the memory of our illustrious brother—taken so unexpectedly from among us—by making his disinterested devotion to science our example, and by striving to catch the tone of his frank and generous spirit. And seeing how very much he succeeded in accomplishing within the limits of a life that has, alas! fallen short by more than thirty years of the old allotted term, let us diligently carry on, in the love of truth, our not unimportant labours, remembering that much may be accomplished in comparatively brief space, if no time be lost, and that to each and all that 'night cometh' at an uncertain hour, under whose dense and unbroken shadow no man can work."

Mr. James Wilson writes: "We should seek in vain to express the full measure of grief, we may say dismay, with which the unlooked-for death of this distinguished naturalist has filled all hearts. While his friends were in the first freshness of their elation at the prospect of the long and bright career which lay before him, and rejoiced in the force and efficiency of that impulse about to be given to the earnest study of the wonderful and manifold works of creation, this most skilful and accomplished interpreter has been suddenly removed from us, and his place now knows him no more for ever. Such dispensations are indeed inscrutable mysteries, and cannot be seen through even by those whose eyes are not bedimmed with tears. But, may all of us, and more especially the widow and the fatherless, bear in mind that 'the Lord reigneth.' He gives and He takes away, and let us bless His name, even amid the bitterness of unavailing sorrow."